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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,977	01/13/2004	Alan D. Kersey	CC-0700	3781

68653 7590 07/16/2007

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EXAMINER	
LAU, TUNG S	
ART UNIT	PAPER NUMBER
2863	

MAIL DATE	DELIVERY MODE
07/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/756,977	KERSEY ET AL.	
	Examiner	Art Unit	
	Tung S. Lau	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,11-21,27-36,38-40,42,43,45 and 46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,11-21,27-36,38-40,42,43,45 and 46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/01/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 06/01/2007 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the date of the publication of the references is/are missing. It has been placed in the application file, but the information referred to therein has not been considered as to the merits (items "noise and vibration control engineering principles and applicants, New flowmeter principle).

The information disclosure statement filed 06/01/2007 fails to comply with the provisions of 37 CFR 1.98 (a)(2) which required a legible copy. The cited document is missing from the file (GB 2210169).

The information disclosure statement filed 06/01/2007 fails to fully comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from applicant's specification or incorporated therein. See Item DE 4306119. It has been placed in the application file, but the information referred to therein has not been considered.

Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 C(1).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 11-15, 17-21, 27-36, 38-40, 42-43 and 45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Harshal B. Nemade (IEEE transactions on instrumentation and measurement, vol. 47, no. 1, February 1998).

Regarding claim 1:

Harshal B. Nemade discloses a method for measuring the flow velocity of a fluid flowing through a conduit (fig. 1) , the method comprising: providing an array of at least two ultrasonic sensors disposed at locations spaced along the length of the conduit in the direction of the flow (fig. 1) each ultrasonic sensor having an ultrasonic transmitter (page 266, lines 2) and an ultrasonic receiver (page 266,

lines 2) and providing a respective sensors signal indicative of a parameter of an ultrasonic signal propagation through the fluid (fig. 3); processing the sensor signals to define a convective ridge in the k-w plane (page 265, equation 2, fig. 1(b)); and determining the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid (page 265, equation 2).

Regarding claim 11:

Harshal B. Nemade discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit (page 265, equation 2), the apparatus comprising: an array of at least two ultrasonic sensors unit disposed at locations spaced along the lrngth of the conduit (fig. 1(a) in the direction of the flow of the fluid (fig. 1 (a)); each ultrasonic sensor having an ultrasonic transmitter (page 266, lines 2) and an ultrasonic receiver (page 266, lines 2) providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; a processor that defines a convective ridge in the k-w plane in response to the sensor signals (fig. 1(b)), and determines the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid (page 265, equation 2).

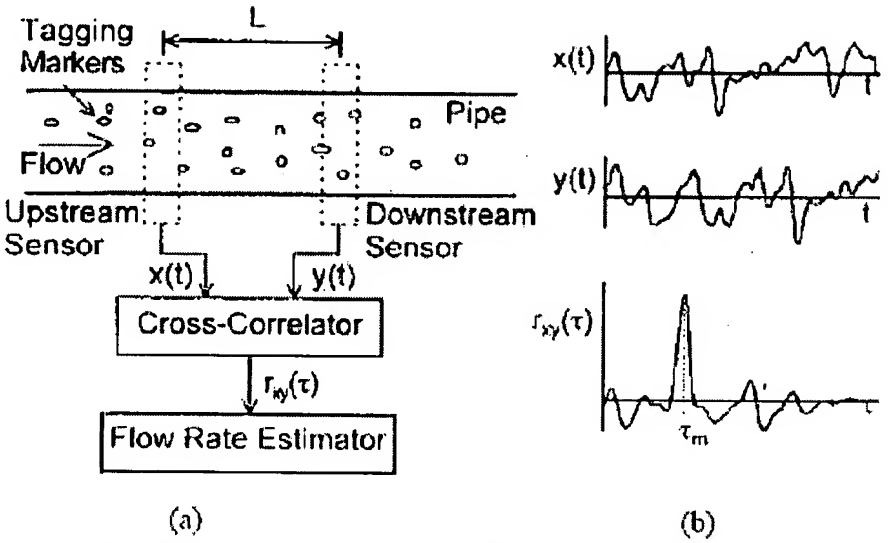

Fig. 1. Schematic of flow measurement by cross correlation technique. (a) Block diagram of cross correlation flowmeter; (b) signals $x(t)$ and $y(t)$ obtained at the two sensing locations, and their cross correlation function $f_{xy}(\tau)$.

Regarding claim 21:

Harshal B. Nemade discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit (fig. 1(a)), the apparatus comprising: an array of at least two ultrasonic sensors disposed at locations spaced along the length of the conduit in the direction of the flow of the fluid (page 266, lines 1-7), each ultrasonic sensor having an ultrasonic transmitter (page 266, lines 2) and an ultrasonic receiver (page 266, lines 2) providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid (fig. 1(a)(b)); means for processing the sensor signals to define a convective ridge in the k-w plane, and means for determining the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid (page 265, equation 2).

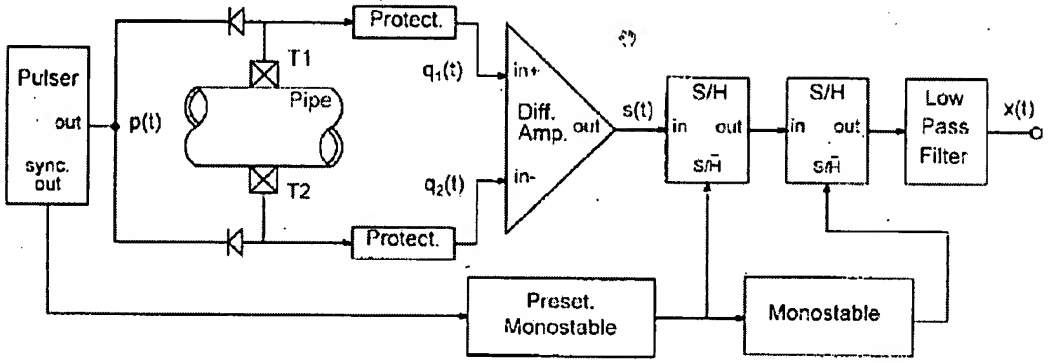

Fig. 2. Block diagram of the system used to sense turbulence in a pipe.

Regarding claim 43:

Harshal B. Nemade discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit (fig. 1), the apparatus comprising: an array of at least two ultrasonic sensors disposed longitudinally at respective locations spaced along the length of the conduit in the direction of the flow of the fluid (fig. 1, page 266, lines 1-5), each ultrasonic sensor having an ultrasonic transmitter (page 266, lines 2) and an ultrasonic receiver (page 266, lines 2) providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid substantially orthogonal to the direction of the fluid flow (fig. 1); and a processor (fig. 4, unit DATA6000), in response to the sensor signals, that determines the flow velocity of the fluid (fig. 3); wherein the processor (fig. 4, DATA6000) uses an array (fig. 1, different signal from sensors) processing algorithm (page 266, lines 8-27) to determine the flow velocity of the fluid (page 266, lines 8-27).

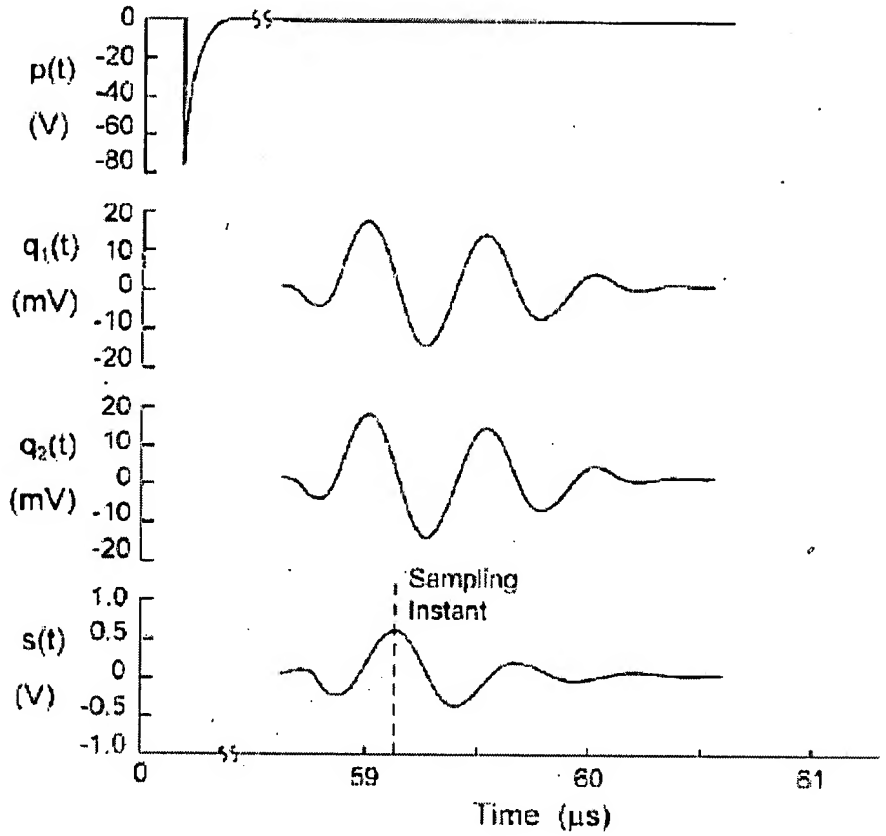

Fig. 3. Waveforms showing excitation pulse $p(t)$, received pulses $q_1(t)$ and $q_2(t)$, and differential amplifier output $s(t)$.

Regarding claim 12, Harshal B. Nemade further discloses the processor samples the sensor signals over a predetermined time period (fig. 6), accumulates the sampled sensor signals over a predetermined sampling period (fig. 6), and processes the sampled sensor signals to define the convective ridge in the k-w plane (fig. 6, 7); **Regarding claim 13**, Harshal B. Nemade further discloses the processor further determines the orientation of the convective ridge in the k-w plane (fig. 7); **Regarding claim 14**, Harshal B. Nemade further discloses the sensor signals are indicative of vortical disturbances with the fluid (fig. 6);

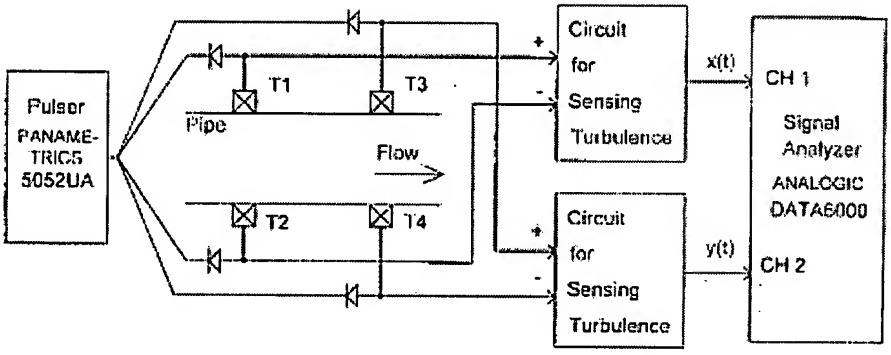

Fig. 4. Block diagram of the experimental setup for flow measurement by cross correlation technique.

Regarding claim 15, Harshal B. Nemade further discloses the processor uses a beam forming algorithm to define the convective ridge in the k-w plane (fig. 7); **Regarding claim 17**, Harshal B. Nemade further discloses the processor determines the slope of at least a portion of the convective ridge by approximating the convective ridge as a straight line (equation 4, 5); **Regarding claim 19**, Harshal B. Nemade further discloses determines the volumetric of the flow (page 268, section V); **Regarding claim 20**, Harshal B. Nemade further discloses sensor signal is transmit time to prolong through the fluid (fig. 1(a)); **Regarding claim 28**, Harshal B. Nemade further discloses pulse-echo configuration (fig. (a)(b)); **Regarding claim 29**, Harshal B. Nemade further discloses at least 3 sensors (page 266, lines 2-3); **Regarding claim 30**, Harshal B. Nemade further discloses amplitude of the signal (fig. 1(b)); **Regarding claim 31**, Harshal B. Nemade further discloses sensors are clamped onto an outer surface of the conduit (abstract); **Regarding claim 32**, Harshal B. Nemade further discloses sensors are attached to the conduit (abstract, fig. 1(a));

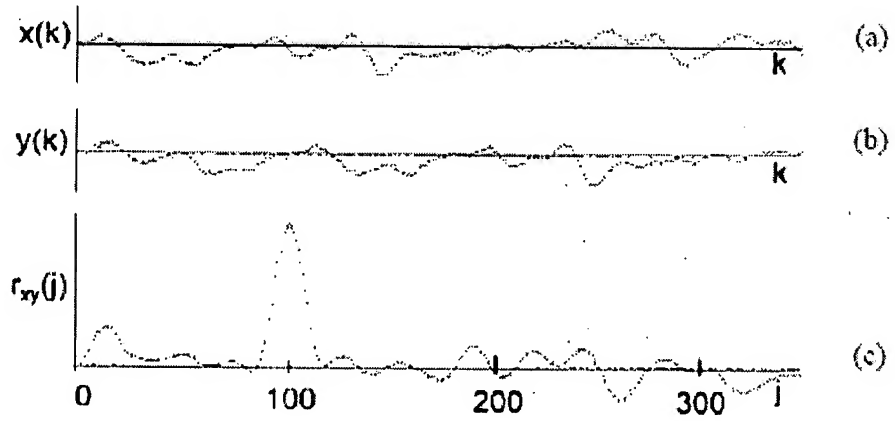

Fig. 7. Results of cross correlator simulation. (a) $x(k)$; (b) $y(k)$; (c) cross correlator output $r_{xy}(j)$, for a delay of 100 samples between $x(k)$ and $y(k)$.

Regarding claim 33, Harshal B. Nemade further discloses sensor are contact with fluid (abstract, fig. 1(a)); **Regarding claim 34**, Harshal B. Nemade further discloses fluid is single phase (abstract ,fig. 1(b)); **Regarding claim 35**, Harshal B. Nemade further discloses fluid is multiphase (abstract ,fig. 1(b)); **Regarding claim 36**, Harshal B. Nemade further discloses multiphase included liquid and gas (page 265, section II, lines 13-14, including any flow as flow vector);

Regarding claim 42, Harshal B. Nemade further discloses the processor uses an array processing algorithm (fig. 2, different processing S/H circuit were use);

Regarding claims 45 and 46, Harshal B. Nemade further discloses at least two ultrasonic sensors (fig. 1(a));

Regarding claim 18, Harshal B. Nemade further discloses each ultrasonic sensor includes an an ultrasonic receiver ' which are disposed such that the ultrasonic signal propagating there between is orthogonal to the direction of the fluid flow (page 1(a), abstract);

Regarding claim 38, Harshal B. Nemade further discloses the ultrasonic receiver of each ultrasonic sensor are disposed opposing each other such that the ultrasonic signal propagates through the fluid substantially orthogonal to the direction of the fluid flow (fig. 1(a), abstract); **Regarding claim 27**, Harshal B. Nemade further discloses sensors are disposed in pitch-catch configuration and receiver are mounted opposing each other (fig. (a)); **Regarding claim 39**, Harshal B. Nemade further discloses each ultrasonic sensor includes an ultrasonic unit having an ultrasonic receiver (page 1(a), abstract); **Regarding claim 40**, Harshal B. Nemade further discloses ultrasonic signal that propagates through the fluid substantially orthogonal to the direction of the fluid flow, which reflects back substantially orthogonal to the direction of the fluid flow to the receiver of each ultrasonic unit (fig 1(a), abstract).

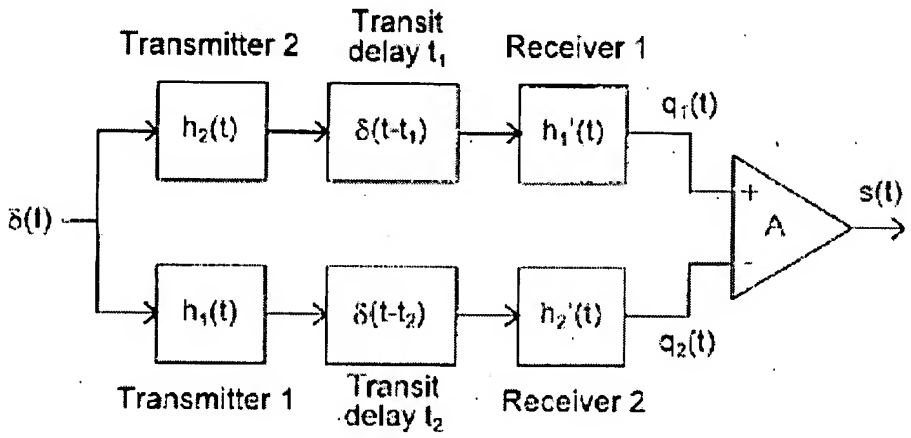

Fig. 5. Block diagram of the model of ultrasonic pulse transmission and reception.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

a. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harshal B. Nemade (IEEE transactions on instrumentation and measurement, vol. 47, no. 1, February 1998) in view of Gysling (U.S. Patent 6,609,069)

Harshal B. Nemade discloses a method and apparatus including the subject matter discussed above except using Capon Algorithm; Gysling discloses using Capon Algorithm in order to have accurate estimate results (Col. 6, Lines 38-46). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Harshal B. Nemade to have the Capon Algorithm taught by Gysling in order to have accurate estimate results (Col. 6, Lines 38-46)

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. I , 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Harshal B. Nemade and Gysling are analogous art because they are from the same field of endeavor, detecting mass flow rate in a conduit.

Response to Arguments

4. Applicant's arguments filed 06/25/2007 with respect to the amended claims have been considered regarding 102(b) rejection anticipated by Harshal B. Nemade and 103(a) rejection as being unpatentable over Harshal B. Nemade (IEEE transactions on instrumentation and measurement, vol. 47, no. 1, February 1998) in view of Gysling (U.S. Patent 6,609,069), but they are not persuasive.

A. Applicants argue in the arguments regarding 101 rejection (remarks page 7-9), are persuasive, the rejection have been withdrawn.

B. Applicants argue in the arguments regarding 103© with Fernald (2004/0168523) (remarks page 9, lines 4-25) are persuasive, the rejection has been withdrawn. (note on page 9, line 25, the examiner assume the applicant representative wanted to write "is now moot" and not "is not mood").

C. Applicants argue in the arguments that the prior art fail to disclose "convective ridge or determine the slope of the convective ridge" (remarks page 10, lines 3-4 and again in lines 7-8, and continues in lines 9-13 on the same page).

Reminds to the applicants that during patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the

specification." Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

While the meaning of claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allowed. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Words in patent claims are given their ordinary meaning in the usage of the field of the invention, unless the text of the patent makes clear that a word was used with a special meaning; Phillips v. AWH Corp., *>415 F.3d 1303, 1313<, 75 USPQ2d 1321>, 1326< (Fed. Cir. 2005) (en banc).

Sunrace Roots Enter. Co. v. SRAM Corp., 336 F.3d 1298, 1302, 67 USPQ2d 1438, 1441 (Fed. Cir. 2003); Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294, 1298 67 USPQ2d 1132, 1136 (Fed. Cir. 2003), and where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim. Toro Co. v. White Consolidated Industries Inc., 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999), See MPEP 2111 [R-5](III). Lack of any specific definition, USPTO

personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997).

Since the applicants has not define in a specific term of "convective", a common meaning will be use. A convective means "refers to movement of current within fluids" (see Wikipedia definition enclosed in this action).

Harshal B. Nemade discloses exactly that in IEEE transactions on instrumentation and measurement, vol. 47, no. 1, February 1998 in the current rejection, page 265, equation 2 where it define the relationship between the flow of the fluid and the detected markes in fig. 1. Therefore Harshal B. Nemade discloses "convective ridge (page 265, equation 2, fig. 1) or determine the slope of the convective ridge".

D. Applicants continue to argue in the arguments that the prior art fail to disclose "the processor uses an array processing algorithm to determine the flow velocity of the fluid" (remarks page 10, lines 15-17).

Harshal B. Nemade discloses the processor (fig. 4, DATA6000) uses an array (fig. 1, different signal from sensors) processing algorithm (page 266, lines 8-27) to determine the flow velocity of the fluid (page 266, lines 8-27).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S Lau whose telephone number is 571-272-2274. The examiner can normally be reached on M-F 9-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 571-272-2269. The fax phone numbers for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tung S. Lau
AU 2863, Patent examiner
July 6, 2007